

# IRF7704GTRPBF-VB Datasheet

## Dual P-Channel 30-V (D-S) MOSFET

### PRODUCT SUMMARY

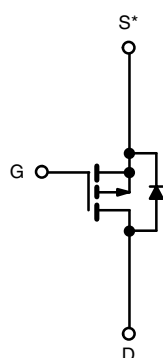
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A) <sup>d, e</sup>	$Q_g$ (Typ.)
- 30	0.016 at $V_{GS} = -10$ V	- 9.5	15 nC
	0.020 at $V_{GS} = -4.5$ V	- 8.0	

### FEATURES

- Halogen-free
- Trench Power MOSFET
- 100 % UIS Tested

### APPLICATIONS

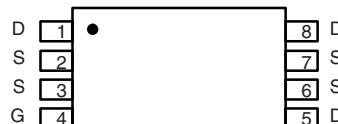
- Load Switches
  - Notebook PCs
  - Desktop PCs
  - Game Stations


**RoHS**  
 COMPLIANT


P-Channel MOSFET

\* Source Pins 2, 3, 6 and 7 must be tied common.

TSSOP-8



Top View

### ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	- 30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ )	$T_C = 25^\circ\text{C}$	- 9.5 <sup>e</sup>	A
	$T_C = 70^\circ\text{C}$	- 8.0 <sup>e</sup>	
	$T_A = 25^\circ\text{C}$	- 8.3 <sup>a, b</sup>	
	$T_A = 70^\circ\text{C}$	- 7.9 <sup>a, b</sup>	
Pulsed Drain Current	$I_{DM}$	- 32 <sup>e</sup>	A
Continuous Source-Drain Diode Current	$T_C = 25^\circ\text{C}$	- 4.1	
	$T_A = 25^\circ\text{C}$	- 2.0 <sup>a, b</sup>	
Avalanche Current	$L = 0.1$ mH	$I_{AS}$	- 20
Single-Pulse Avalanche Energy		$E_{AS}$	20
Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	$P_D$	5.0
	$T_C = 70^\circ\text{C}$		3.2
	$T_A = 25^\circ\text{C}$		2.5 <sup>a, b</sup>
	$T_A = 70^\circ\text{C}$		1.6 <sup>a, b</sup>
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 150	$^\circ\text{C}$

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a, c</sup>	$R_{thJA}$	38	50	$^\circ\text{C/W}$
Maximum Junction-to-Foot	$R_{thJF}$	20	25	

Notes:

- Surface mounted on 1" x 1" FR4 board.
- $t = 10$  s.
- Maximum under Steady State conditions is  $85^\circ\text{C/W}$ .
- Based on  $T_C = 25^\circ\text{C}$ .
- Limited by package.

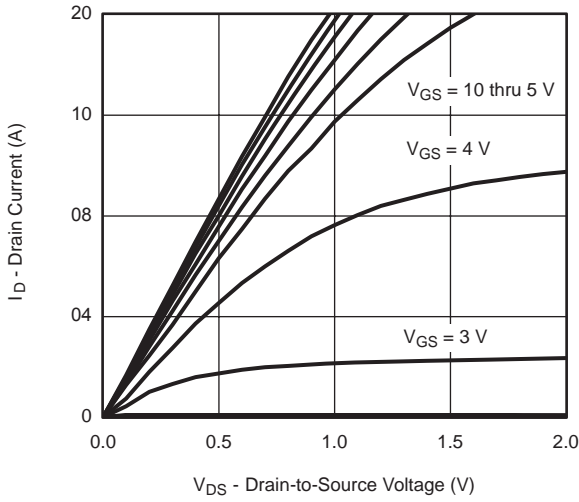
SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 30			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		- 31		mV/ $^{\circ}\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			4.5		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 1.0		- 3.0	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$			- 1	$\mu\text{A}$
		$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^{\circ}\text{C}$			- 5	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq -10\text{ V}, V_{GS} = -10\text{ V}$	- 30			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -7.3\text{ A}$		0.016		$\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -6.2\text{ A}$		0.020		
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -10\text{ V}, I_D = -9.1\text{ A}$		23		S
Dynamic <sup>b</sup>						
Input Capacitance	$C_{iss}$	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		1350		pF
Output Capacitance	$C_{oss}$			215		
Reverse Transfer Capacitance	$C_{rss}$			185		
Total Gate Charge	$Q_g$	$V_{DS} = -15\text{ V}, V_{GS} = -10\text{ V}, I_D = -9.1\text{ A}$		32	50	nC
Gate-Source Charge	$Q_{gs}$	$V_{DS} = -15\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -9.1\text{ A}$		15	25	
Gate-Drain Charge	$Q_{gd}$			4		
Gate Resistance	$R_g$			7.5		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		5.8		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \equiv -1\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		10	15	ns
Rise Time	$t_r$			8	15	
Turn-Off DelayTime	$t_{d(off)}$			45	70	
Fall Time	$t_f$			12	25	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \equiv -1\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		42	70	
Rise Time	$t_r$			35	60	
Turn-Off DelayTime	$t_{d(off)}$			40	70	
Fall Time	$t_f$			16	30	
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^{\circ}\text{C}$			- 4.1	A
Pulse Diode Forward Current	$I_{SM}$				- 32	
Body Diode Voltage	$V_{SD}$	$I_S = -2\text{ A}, V_{GS} = 0\text{ V}$		- 0.75	- 1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -2\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^{\circ}\text{C}$		34	60	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			22	40	nC
Reverse Recovery Fall Time	$t_a$			11		ns
Reverse Recovery Rise Time	$t_b$			23		

Notes:

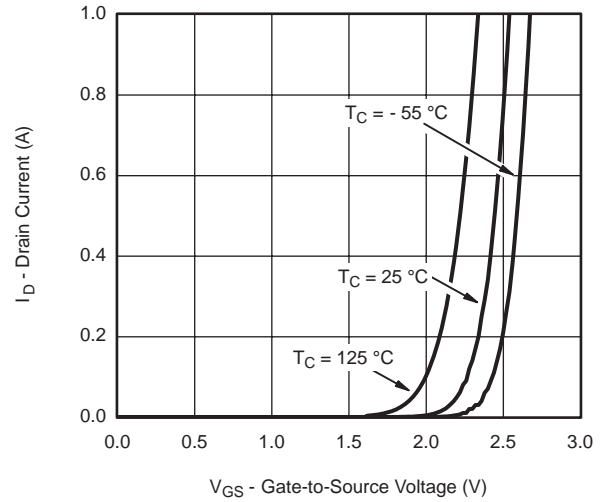
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

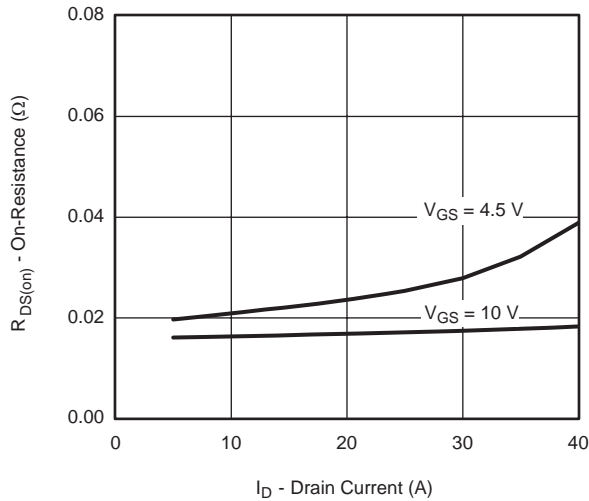
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



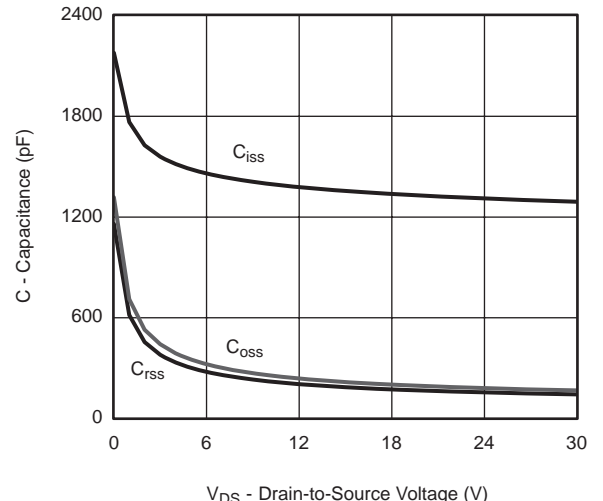
Output Characteristics



Transfer Characteristics



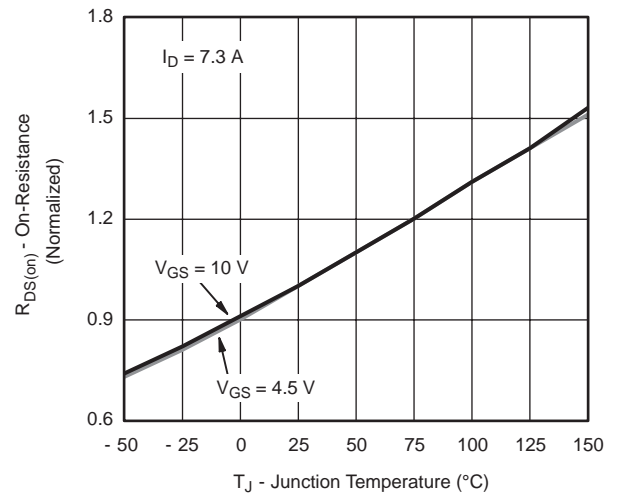
On-Resistance vs. Drain Current



Capacitance

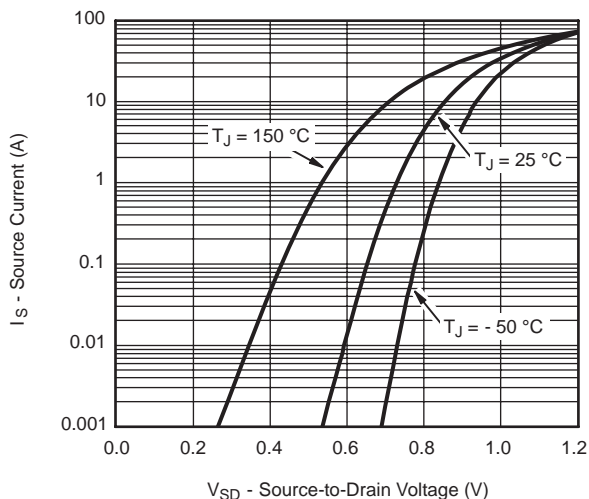


Gate Charge

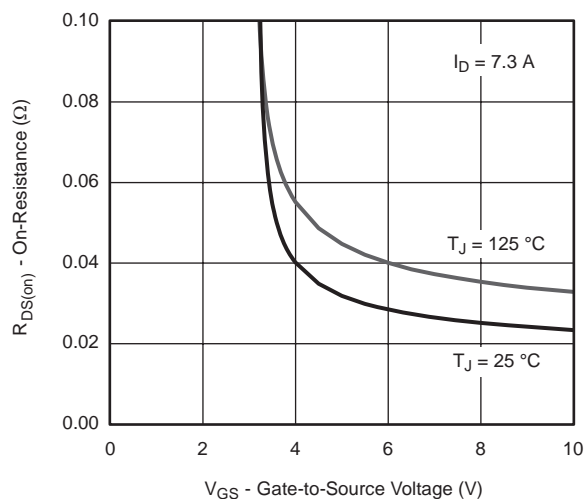


On-Resistance vs. Junction Temperature

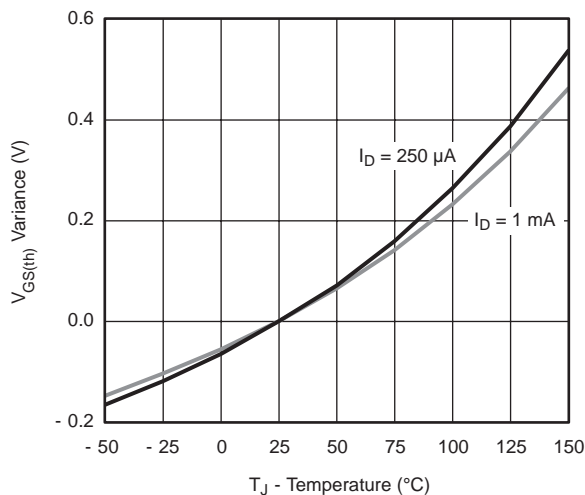
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



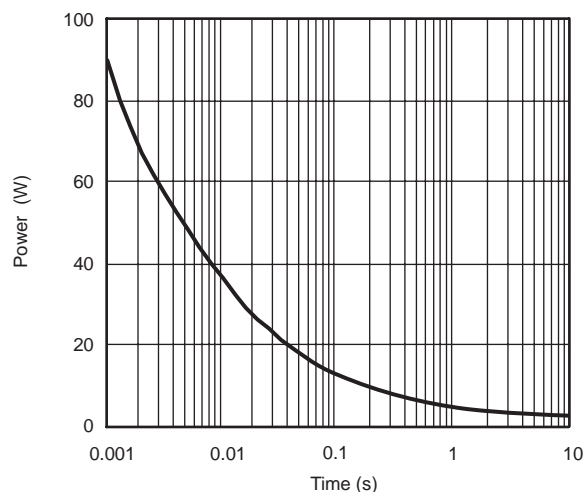
Source-Drain Diode Forward Voltage



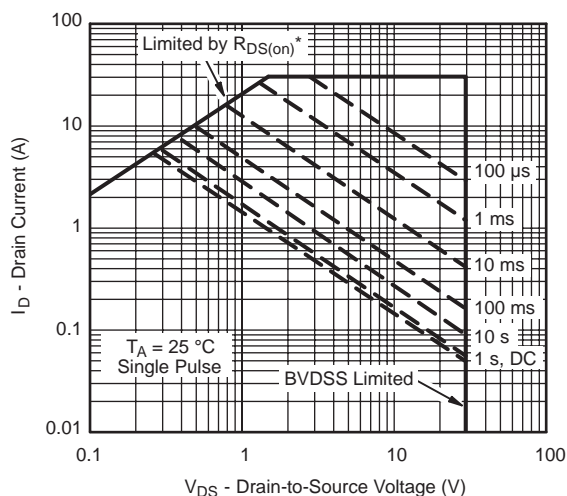
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



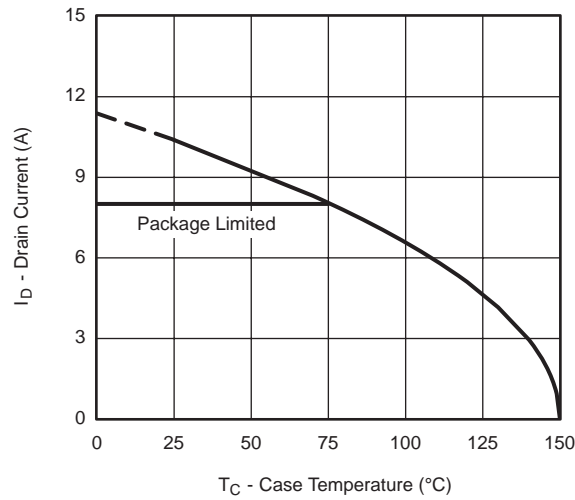
Single Pulse Power, Junction-to-Ambient



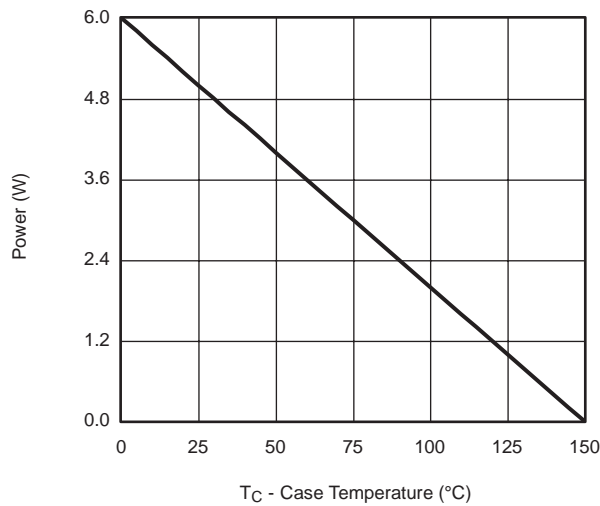
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

Safe Operating Area

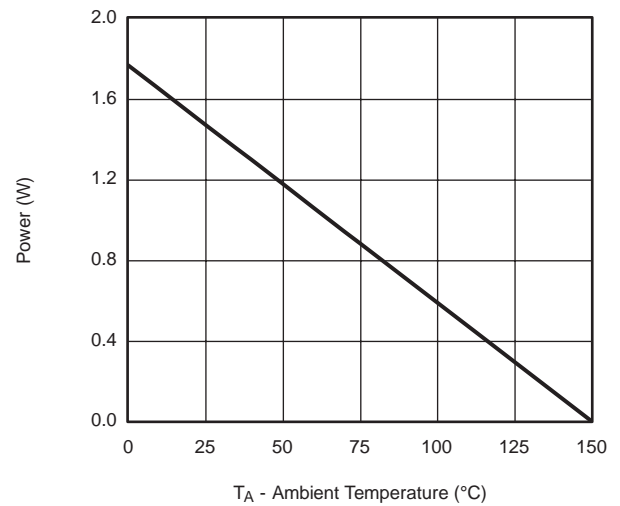
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



**Current Derating\***



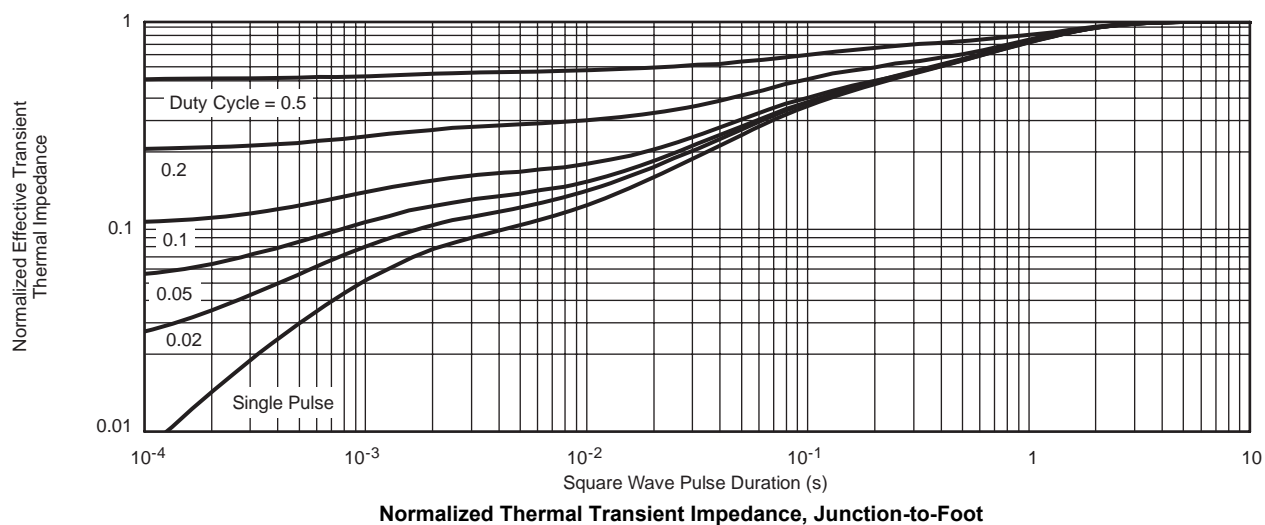
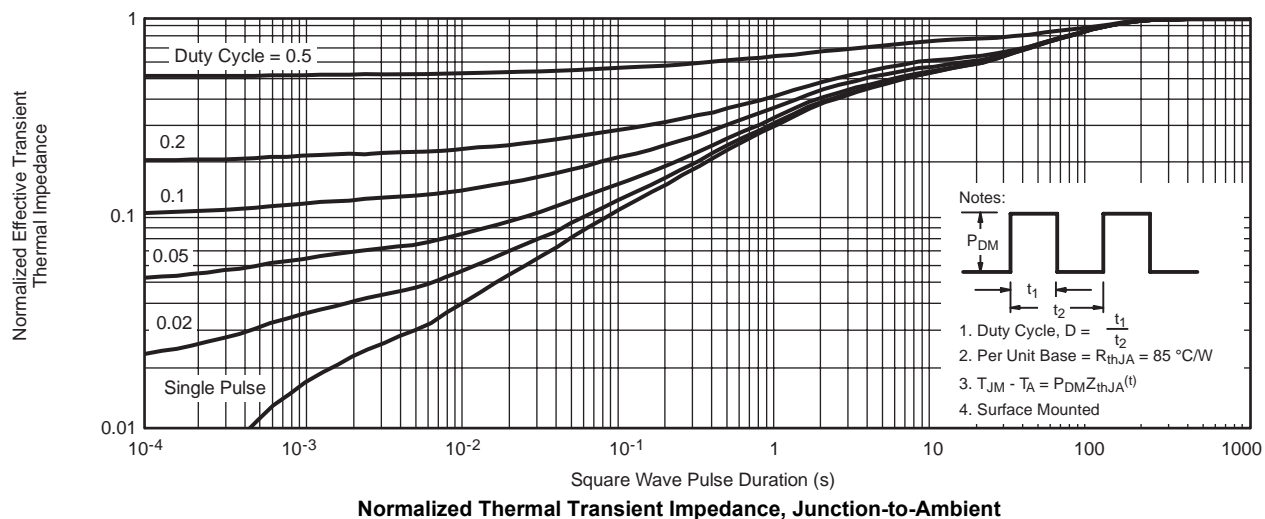
**Power, Junction-to-Foot**



**Power Derating, Junction-to-Ambient**

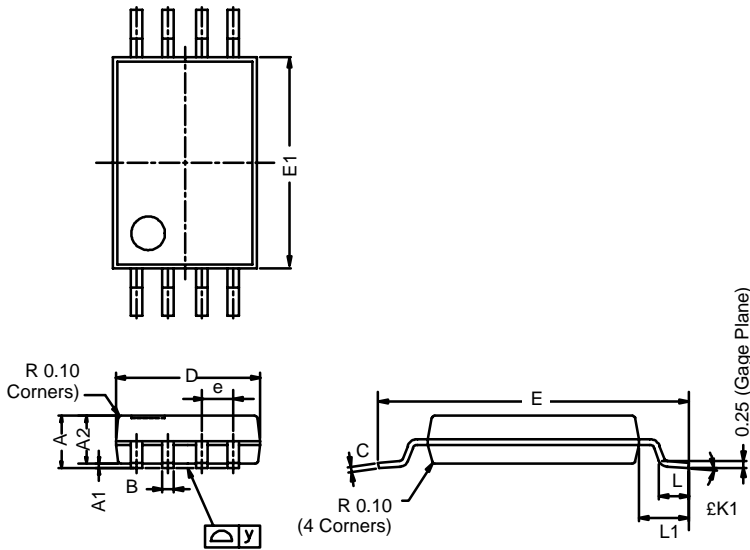
\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 150$  °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



# IRF7704GTRPBF-VB

**TSSOP: 8-LEAD**  
JEDEC Part Number: MO-153



Dim	MILLIMETERS		
	Min	Nom	Max
A	—	—	1.20
A <sub>1</sub>	0.05	0.10	0.15
A <sub>2</sub>	0.80	1.00	1.05
B	0.19	0.28	0.30
C	—	0.127	—
D	2.90	3.00	3.10
E	6.20	6.40	6.60
E <sub>1</sub>	4.30	4.40	4.50
e	—	0.65	—
L	0.45	0.60	0.75
L <sub>1</sub>	0.90	1.00	1.10
Y	—	—	0.10
⊙K1	0°	3°	6°
ECN: S-03946—Rev. G, 09-Jul-01 DWG: 5844			

Figure 1: Schematic diagram of the four-bar linkage mechanism. The diagram shows four vertical bars connected by horizontal joints. The top joints are labeled with dimensions 0.092 (2.337) and 0.026 (0.660). The bottom joints are labeled with dimensions 0.014 (0.356) and 0.012 (0.305). The vertical dimensions are 0.262 (6.655) and 0.182 (4.623). A small vertical dimension of 0.040 (1.016) is also shown.

服务热线：400-655-8788



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